

## CONTACT SURFACES FOR ELECTRICAL CONTACTS

FIELD OF THE INVENTION

The present invention relates to improved contact surfaces for electrical contacts.

5 BACKGROUND INFORMATION

Electrical connectors such as bushings and plugs are typically produced from a substrate made of an alloy on copper basis, which provides good electrical conductivity. If the electrical connector is exposed to higher temperatures during operation, 10 such as under the engine hood of a motor vehicle, the substrate is made from an alloy on copper basis having high stability and a high strain-relaxation resistance.

A cover layer is often applied on the substrate to reduce 15 tarnishing of the copper-based substrate at higher temperatures and to improve the soldering ability. Typical cover layers are made of nickel, palladium/nickel alloys, tin or tin alloys. To minimize costs, tin is often used, predominantly fire-tinned or galvanically deposited layers in 20 the range of a few  $\mu\text{m}$ . Tin is characterized by its ductility and its excellent electrical conductivity.

The substrate is usually made of copper-based alloys such as CuSn<sub>4</sub>-bronze, CuNiSi, etc., which often serve as base material 25 for electrical plug-in connections. At higher temperatures it may happen that copper diffuses out of the substrate and combines with the tin, forming intermetallic compounds such as Cu<sub>6</sub>Sn<sub>5</sub> and Cu<sub>3</sub>Sn. The formation of such intermetallic compounds reduces the quantity of unreacted or free tin on the surface. 30 This has a detrimental effect on the electrical, corrosion and other performance characteristics.

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